# Recommendations for Improvements to Geospatial Capabilities for Disaster Response

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On September 26, 2005 at the National States Geographic Information System Council's Annual Conference, an informal evening session was held that brought together representatives from the impacted Gulf States impacted and as well as other GIS practitioners involved in the response to Hurricanes Katrina and Rita. The thoughtful and open discussion that occurred in that session was rich with specific examples, problems, and issues that the presenters had experienced during the recovery efforts.

Listening to that discussion as well as other presentations during the week reminded me of the significant distance that, we, as a country still have to go to properly integrate geospatial tools into our emergency management efforts. I was also reminded of many lessons that we, in New York State, learned during our response to 9/11. While there are endless details that are required, it is clear that, a few, simple steps could be taken right now to ensure better preparedness for the next emergency.

**Problems Identified:**
1) Finding GIS Coordinators within impacted states and connecting them with local, state, and federal officials in a coordinated manner.
2) Lack of coordination between GIS resources and Emergency Management Officials.
3) Locating GIS resources and data to support the recovery efforts.
4) Lack of a well practiced method to use GIS resources in support of emergency response for an event of that scale.
5) Lack of rapid on-site imagery and data to support emergency response efforts immediately following the storms.
6) Lack of proper data back-up and recovery methods.

**Discussion**:
Among many other things stated at the NSGIC session, we heard how representatives from the NGA were able to contact the President of NSGIC after Katrina to find GIS Coordinators within the impacted States to assist in the response efforts. This was a wonderful service that NSGIC was able to provide, but much better organization needs to be in place for future events and back-ups need to be in place to accommodate the unexpected. In addition much better coordination between GIS practitioners and emergency management officials is needed.

The following recommendations are divided into two groups. Tier one includes very simple ideas that should and can be implemented immediately. Tier two includes recommendations that are critically needed, but will take additional time or effort to implement.

**Tier One Recommendations:**
Recommendation 1: Develop a national web site for listing GIS Coordinators for each state with 24x7 contact info. Work through NSGIC to obtain the necessary information on the GIS Coordinators. This site could be password protected, if needed, with the site and passwords provided to each state emergency management office, FEMA, USGS, NGA and other organizations, as required.
Timetable: 2 months. Ideally, this should be done in less than a month. It could start by being hosted by NSGIC, where the data can be posted in a secure location with access provided to FEMA, DHS, and State Coordinators. Eventually, FEMA or DHS should host the site.
Responsibility: NSGIC, state GIS coordinators, state emergency management officials

Recommendation 2: A backup coordinator should be designated for each state and their 24x7 contact information should be posted on the secure web site as well.
Timetable: 3 months.
Responsibility: State GIS Coordinators.

Recommendation 3: Develop a list of emergency management officials who GIS Coordinators in each state should contact during an emergency along with their 24x7 contact information. This listing should include not only contacts in the State Emergency Management Agencies, but also those in Federal agencies such as FEMA.
Timetable: 2 months.
Responsibility: State GIS Coordinators.

Recommendation 4: Lists of state and local GIS data available (including its custodian, and that person's 24x7 contact information) for use in responding to emergencies in each state should be added to the web site. If possible, metadata should be included.
Timetable: 3 months.
Responsibility: State GIS Coordinators.

Recommendation 5: A list of GIS resources and/or potential GIS volunteers should be developed. This should include staff and their skills/expertise as well as equipment and its location in each state that can be called on for use in emergencies. During an emergency this list should be expanded to provide a listing of GIS professionals (and their 24x7 contact information) working on the emergency to assist in communication.
Timetable: 5 months.
Responsibility: State GIS Coordinators.

Recommendation 6: Gather state and local data needed for emergency response and store it in secure locations in a minimum of two diverse regions of each state. If possible, store and catalogue the data on hard drives to enable it to be moved quickly when it is needed for emergency response.
Timetable: 6 months.
Responsibility: State GIS Coordinators and Emergency Management Officials.

**Tier Two Recommendations:**
Recommendation 7: Involve State GIS Coordinators and designated GIS practitioners in quarterly, scenario-based training exercises with State Emergency Management Officials. Responsiveness to scenarios should be measured and the results, the lessons learned and the overall scenarios should be posted to the secure web site for others around the country to learn from and to allow Emergency Management Officials to assess their overall readiness. Later, on-line scenario based training should be evaluated for inclusion on the site as well.
Timetable: 6 months.
Responsibility: State GIS Coordinators and State Emergency Management Officials.

Recommendation 8: Develop a secure FTP site to allow emergency responders the ability to access/download each state's data. This site should be located at an "industrial strength" facility similar to that at the USGS' EROS Data Center. This secure facility should allow authorized workers, from around the country, to retrieve the data to respond to an emergency. It should also allow emergency responders, within an impacted area, to post data to the site in a secure manner.
Timetable: 9 months.
Responsibility: State Emergency Management Officials.

Recommendation 9: Develop and execute national/regional contracts for emergency imagery services with various vendors. Develop contracts to allow federal, state, county or municipal governments have access to them immediately if an emergency arises. These contracts should

be in place and require vendors to be on site within 24 hours or less of an event. These contracts should be accessible by all levels of government and be activated by allowing any government entity to forward funding to the contract and a scope of work being agreed to.
Timetable: 12 months.
Responsibility: FEMA, State Emergency Management Officials, State GIS Coordinators

Recommendation 10: Develop secure regional sites that can provide GIS web service delivery of data to designated responders in and outside of the impacted region.
Timetable: 12 months.
Responsibility: FEMA

Recommendation 11: Purchase standard, hand held, wireless devices with GPS capability for each state for rapid GIS data collection in times of emergencies. Issue these devices through the State Emergency Management Agencies and incorporate their use into the quarterly GIS training scenarios.
Timetable: 9 months.
Responsibility: FEMA

Recommendation 12: Purchase Mobile GIS Units to provide full GIS capabilities to support emergency response. This should include vans with workstations, laptops, plotters, wireless/satellite communication systems, emergency generation capabilities, etc. Each van should have a full set of municipal, county and state data for each state in its region. An additional set of data should be stored on hard drives in the van for distribution to designated emergency management operation centers, if needed.
Timetable: Phase I: 12 months to purchase, outfit and locate across the country regionally in a strategic manner based on a risk assessment. As soon as units have been deployed, a coordinated training program within each state in a region should be conducted using these units to maximize their effectiveness in the time of a disaster.
Phase II: 12 months to provide similar vans in each of the 50 states.
Responsibility: FEMA, (Specifications for GIS capabilities could be developed by State GIS Coordinators through NSGIC.)

Recommendation 13: Pursue the development of new products to enable rapid deployment, processing and delivery of imagery products for emergency response. Our experience after 9/11 showed that the delivery of imagery within 12 hours of its capture is simply not good enough. Emergency responders need data to plan operations for the next shift. Data with yesterday's results simply not adequate. Hence, during 9/11, aerial photographs with low end digital cameras were taken every 3 hours to provide a simple idea of the status of immediate areas of concern. We can and must do better. Continued research and testing in this area is a necessity.
Timetable: 12-24 months.
Responsibility: FEMA, NGA

**Conclusion:**
None of the ideas presented above are new or revolutionary. They have been learned the 'hard way' by participation in natural and man-made emergencies since 1998. Many are direct copies of things that were employed post 9/11. While the recovery efforts from Katrina and Rita will continue for the foreseeable future and much analysis will be done over failures that may have occurred, I would submit that these simple suggestions have been shown to be needed multiple times, make reasonable sense, don't require significant thought, are doable, and merely require action to be taken as a start to significantly improve GIS support for emergency management in this country.